

PB-229 157

PRESENT MUNICIPAL WATER USE INCLUDING
INFORMATION ON DEFICIENCIES IN SUPPLY
IN THE ARKANSAS-WHITE-RED BASINS

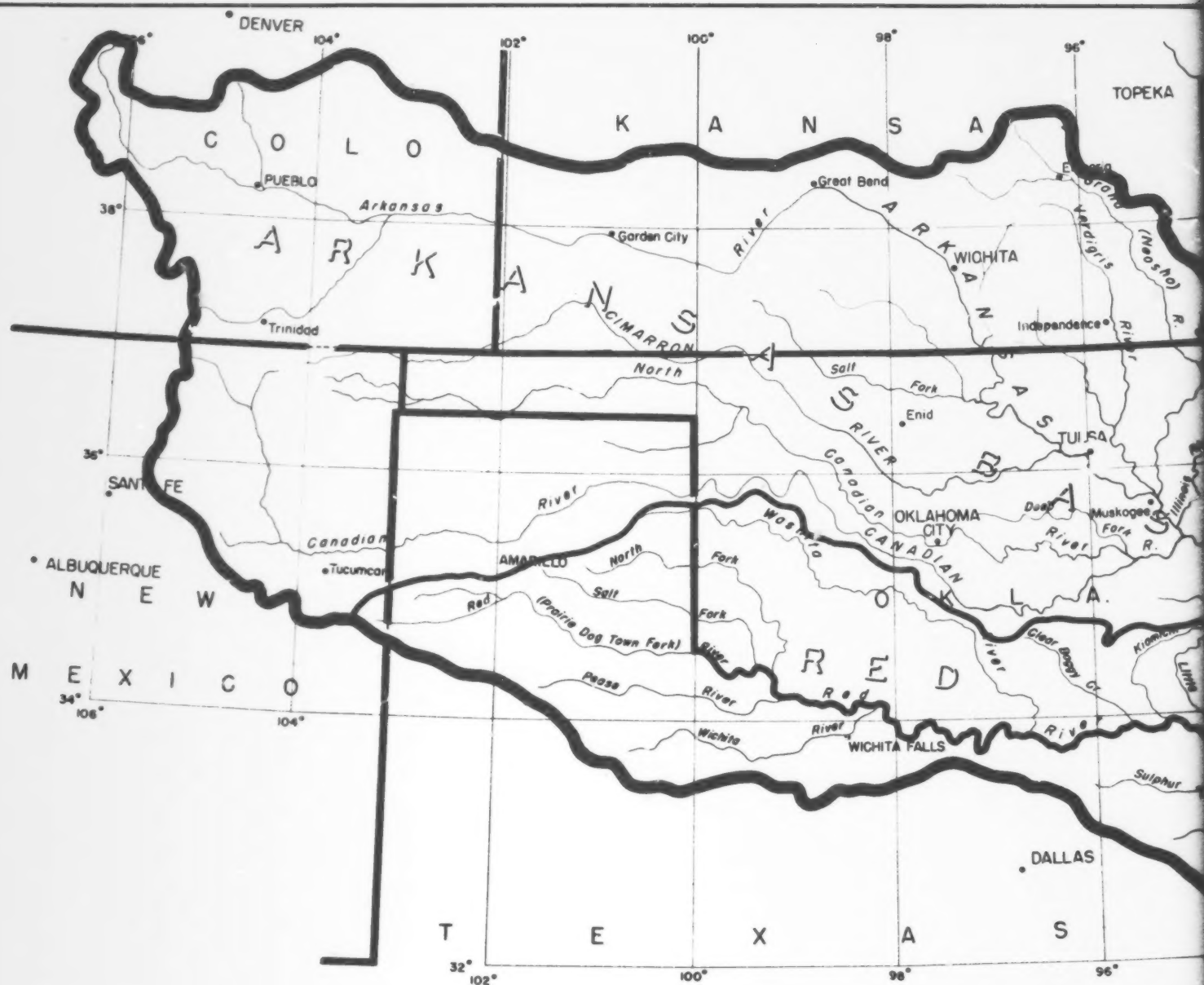
Public Health Service
Little Rock, Arkansas

October 1952

DISTRIBUTED BY:

NTIS

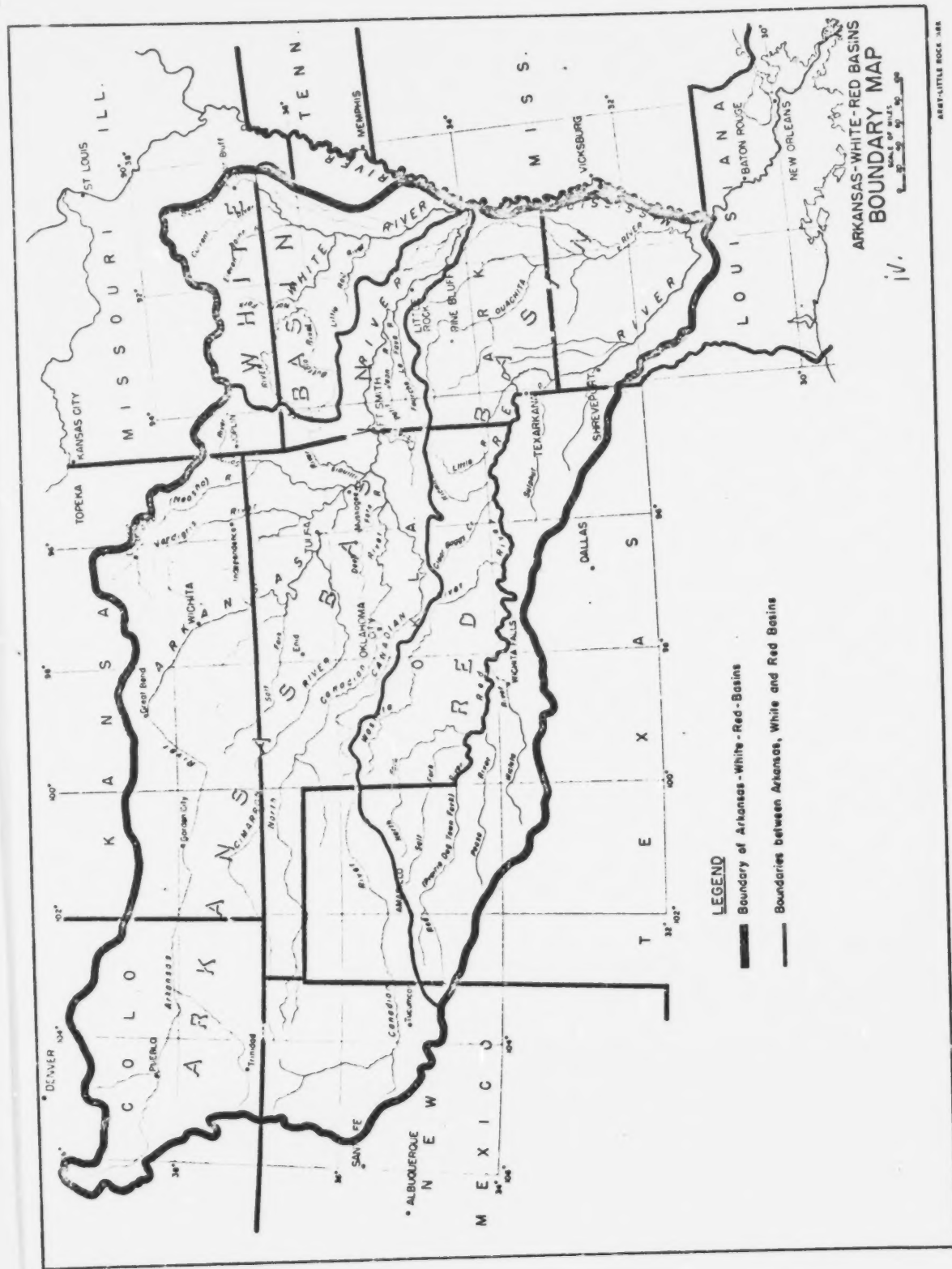
National Technical Information Service
U. S. DEPARTMENT OF COMMERCE
5285 Port Royal Road, Springfield Va. 22151



LEGEND

Boundary of Arkansas-White-Red-Basins

Boundaries between Arkansas, White and Red Basins



Subject: Report on Present Municipal Water Use Including
Information on Deficiencies in Supply in the
Arkansas-White-Red Basins

To: Chairman, Domestic and Industrial Water Supply
Work Group

Submitted by: Federal Security Agency, Public Health Service,
Southwest-Lower Mississippi Drainage Basins
Office, Little Rock, Arkansas

There is submitted herewith a report which consists of an analysis of data compiled by the States and various Federal agencies regarding present municipal water use and deficiencies of municipal water supplies within the AWR Basins. This analysis is intended to be of assistance in determining future municipal water supply needs for the basins.

The analysis of present municipal water use was determined from the basic water supply data contained in the "Inventory of Water and Sewage Facilities of the United States (1949)" compiled by the Public Health Service in cooperation with the State health departments.

Appendix A is an inventory of present municipal water use and source of supply for communities within AWR Basins serving over 1,000 population.

Appendix B, referring to presently recognized deficiencies of water supplies, is a summary of information obtained from the various State health departments.

TABLE OF CONTENTS

	<u>Page</u>
PRESENT MUNICIPAL WATER USE	1
Authority	1
Summary	1
Acknowledgments	2
Definition	2
Source of Data	3
Inventory of Water Supply Facilities	3
Municipal Water Use	3
Effects of Precipitation and Population	4
Trend Towards Urbanization	4
Source of Supply	5
Treated Supplies	5
Present Quantity and Quality Deficiencies	6

FIGURE NO.

1. Municipal Water Use from Ground Surface Sources . .	7
2. Present Municipal, Per Capita Water Use by Precipitation Zones	8
3. Municipalities Using Ground or Surface Water Sources	9

TABLE NO.

1. Municipal Water Use	10
2. Municipal Water Use According to Source of Supply	11
3. Number of Communities and Percentage of Populations Served by Different Types of Water Supplies	12
4. Percent of Population Served by Disinfected Water Supplies	13
5. Percent of Communities Served by Disinfected Water Supplies	14
6. Percent of Total Population Served by Treated Water Supplies	15

367

11.

APPENDIX A - INVENTORY OF PRESENT MUNICIPAL WATER USE

	Page
Arkansas Section	16
Colorado Section	19
Kansas Section	20
Louisiana Section	23
Missouri Section	25
New Mexico Section	26
Oklahoma	27
Texas Section	32

APPENDIX B - INFORMATION ON QUANTITY AND QUALITY DEFICIENCIES

Arkansas Section	33
Colorado Section	34
Kansas Section	35
Louisiana Section	36
Missouri Section	37
New Mexico Section	38
Oklahoma	39
Texas Section	40
	45

PRESENT MUNICIPAL WATER USE

including information

on

Deficiencies of Supply

Authority

At the third meeting of the Arkansas-White-Red Basins Inter-Agency Committee held in Jefferson City, Missouri, on October 26, 1950, the Federal Security Agency (Public Health Service) was assigned the task of assembling existing data from State and Federal agencies regarding present domestic and industrial water use including inadequacy of water resources.

At subsequent meetings of the Domestic and Industrial Water Supply Work Group the general policies were outlined for the preparation of this report. It was agreed that the States will be responsible for the determination and presentation of domestic and industrial water supply needs. The Federal agencies will assist in developing the data for suitable presentation and take the initiative necessary for adequate planning of engineering facilities to provide future water supply. Initial task assignments designated the State representatives to present data on existing domestic and industrial use of water and supply deficiencies, and in cooperation with the Federal Security Agency, Public Health Service, to present the data to the work group.

Summary

The report "Present Municipal Water Use" was prepared for the purpose of giving assistance to the Domestic and Industrial Water Supply Work Group in the determination of future municipal water supply needs for the Arkansas-White-Red Basins.

It is felt that the data on municipal water use are reliable and, in general, covers every municipality (total of 992 communities) in the AWR area. Total municipal water use for the area is 420 million gallons daily, serving nearly $3\frac{1}{2}$ million persons. From an analysis of this data it is apparent that the per capita water use is inversely related to the average annual precipitation of the area. Furthermore, the per capita water use is directly proportioned to the population up to a total of approximately 50,000 - 100,000.

Appendix A is an inventory of present municipal water use and source of supply for communities within AWR Basins serving over 1,000 population.

Appendix B lists deficiencies (quantity or quality considerations) of water supplies for specific locations and also the status of certain proposed projects which are filed with State health departments.

Acknowledgments

This report has been prepared by the Southwest-Lower Mississippi Drainage Basins Office of the Public Health Service with the assistance of suggestions from the Domestic and Industrial Water Supply Work Group members.

Basic municipal water use data were taken from the 1949 edition of the "Inventory of Water and Sewage Facilities in the United States." This tabulation is maintained as a cooperative activity of the Public Health Service and the various State health departments. Information was also obtained from "Municipal Sanitary Status in Texas (1950 data)," Texas State Department of Health and "Public Water Supplies in Oklahoma, 1951," U. S. Geological Survey in cooperation with Oklahoma Planning and Resources Board.

The information on deficiencies of water supplies is a summary obtained from various State health departments.

Below are listed the agencies who contributed basic water use data:

Arkansas State Board of Health
Arkansas (U. S. Geological Survey)
Colorado Department of Public Health
Kansas State Board of Health
Louisiana Department of Health
Louisiana (U. S. Geological Survey)
Louisiana Stream Control Commission
Louisiana Department of Public Works
The Division of Health of Missouri
New Mexico Department of Public Health
Oklahoma State Department of Health
Oklahoma Planning and Resources Board
Texas State Department of Health

Definition of Municipal Water Use

Water for municipal use includes all water entering the public distribution systems. This includes water used for domestic purposes, by business establishments, by some manufacturers, distribution system losses, fire protection and other public purposes. Public-supply systems include both those publicly and privately owned.

Source of Data

The analysis of data on present municipal water use presented herein is based on basic water supply data presented in the "Inventory of Water and Sewage Facilities in the United States, (1949)," as compiled by the Public Health Service in cooperation with the State health departments.

Inventory of Water Supply Facilities in the AWR Basins

The following municipal water supply data for the communities within the AWR Basins are available from the inventory:

Name of community	Rated plant capacity
Populations	Average plant output
Date operation started	Treatment
Estimated population served	Laboratory control
Ownership	Distribution storage
Source of supply	

Appendix A, which lists source of supply, estimated population served, and present water use for the communities within the AWR Basin, was compiled from the inventory except as noted.

Municipal Water Use

The total municipal water use by State sections of each basin is given in Table No. 1. Total water use varies from approximately five million gallons daily in the AWR portion of New Mexico to 133 million gallons daily in Oklahoma. The States of Arkansas and Oklahoma have approximately the same total area in the AWR Basins, but Oklahoma has a usage two and a third times that of Arkansas. It is significant that the municipal water use in the White River Basin is only 16.9 million gallons daily whereas the total for the AWR Basins is 420 million gallons daily.

In general, the total municipal water use within State sections, on a unit area basis, compares with the total municipal water use for respective States. Exceptions are to be noted for the States of Missouri, Texas and New Mexico. In these States there are a number of large cities lying outside of the AWR Basins thereby increasing the total municipal water use for these States.

The total municipal water use, from ground and surface sources, by State sections of each major basin is shown graphically in Figure No. 1.

The principle factors that affect the quantity of water used per capita are the living standards of the inhabitants of the district; the size of the community; the quality and cost of the water;

the water pressure; the amount used by industries and manufacturing plants; the quantity used for public purposes; the amount of waste and leakage; the percentage of the supply that is metered; the quantity needed for watering lawns and gardens; the quantity used to prevent freezing of pipes during cold weather; the amount used for air conditioning; and the amount required for prevention of fire damage.

The American people are accustomed to the liberal use of water, and its consumption is increasing, along with the trend toward urbanization. More families than ever before in the United States have bathrooms and washing machines. New water-using devices, such as automatic dishwashing machines and garbage disposal fixtures are appearing in the kitchen in increasing numbers. Air-conditioning of factories, offices, theaters, and stores is quite common.

A generation ago 100 gallons per day per person was considered to be a fair average for the use of water in American municipalities. At present this figure has increased to approximately 135 gallons per capita per day. Table No. 2 illustrates the municipal per capita water use for each of the AWR Basins according to source of supply and compares the AWR usage with the national average.

Effects of Precipitation and Population

In arid regions or where summers are hot and dry, much water will be used for watering lawns. Domestic use will be further increased by more bathing, while public use will be increased by much street flushing, use in parks and recreation fields. High temperatures will also lead to high water use for air-conditioning purposes. Figure No. 2 is a map and accompanying chart illustrating present municipal per capita water use for zones of similar rainfall characteristics. The chart shows that the per capita water use increases for regions having lower rainfall rates. One exception to this statement, not evident from an inspection of Figure No. 2, concerns many small towns in the AWR portion of New Mexico. Here, in a region of extremely low rainfall, because of a limited quantity of water per capita usage figures are as low as 15-20 gallons per day. In general, the per capita water use increases with increasing population in a given rainfall zone. However, this water use rate appears to reach a maximum value in cities with populations of 50,000 to 100,000 and actually shows a tendency to decrease as population is increased further.

Trend Towards Urbanization

In 1950 there were slightly more than 3 million people in the AWR Basin area living in urban communities of over 2,500 population. This was 29 percent more urban dwellers than there were in the area in 1940 and almost 41 percent more than existed in 1930. The

increase in urban population for the region was considerably more than the nation's increase of 19 percent. However, the AVR Basins area is still far behind in total urbanization as compared to the nation and most other regions. In 1950, only about 43 persons out of every 100 were classified as urban within the basins, whereas the national figure is 64 persons per 100. Any increases in urbanization will, of course, increase municipal water requirements.

Source of Supply

From the standpoint of population served and total consumption, the use of underground waters is of equal importance to the use of surface waters for municipal supplies in the basin. However, there are over three times as many communities using underground sources as there are utilizing surface sources (See Table No. 3). The larger number of smaller communities developed supplies from underground sources principally for economic reasons, whereas the larger cities resorted to surface supplies for reasons of adequate supply or quality. Municipalities within the AVR Basins using ground or surface water sources are shown on two maps (See Figure No. 3). For tabulation purposes spring supplies are included with ground water supplies.

Treated Supplies

According to the Public Health Service Drinking Water Standards (1946) the chemical and physical characteristics of the supply should be clear, colorless, odorless, pleasant to the taste, should be free from toxic salts, and should not contain an excessive amount of soluble mineral substance or any chemical employed in treatment. The chemical substances which may be present in natural or treated waters should preferably not occur in excess of the following concentrations:

<u>Constituents</u>	<u>Should not exceed (p.p.m.)</u>
Iron (Fe) & Manganese (Mn) together	0.3
Fluorides (F)	1.5
Magnesium (Mg)	125
Chlorides (Cl)	250
Sulphates (SO ₄)	250
Dissolved Solids	500 (1,000 permitted)

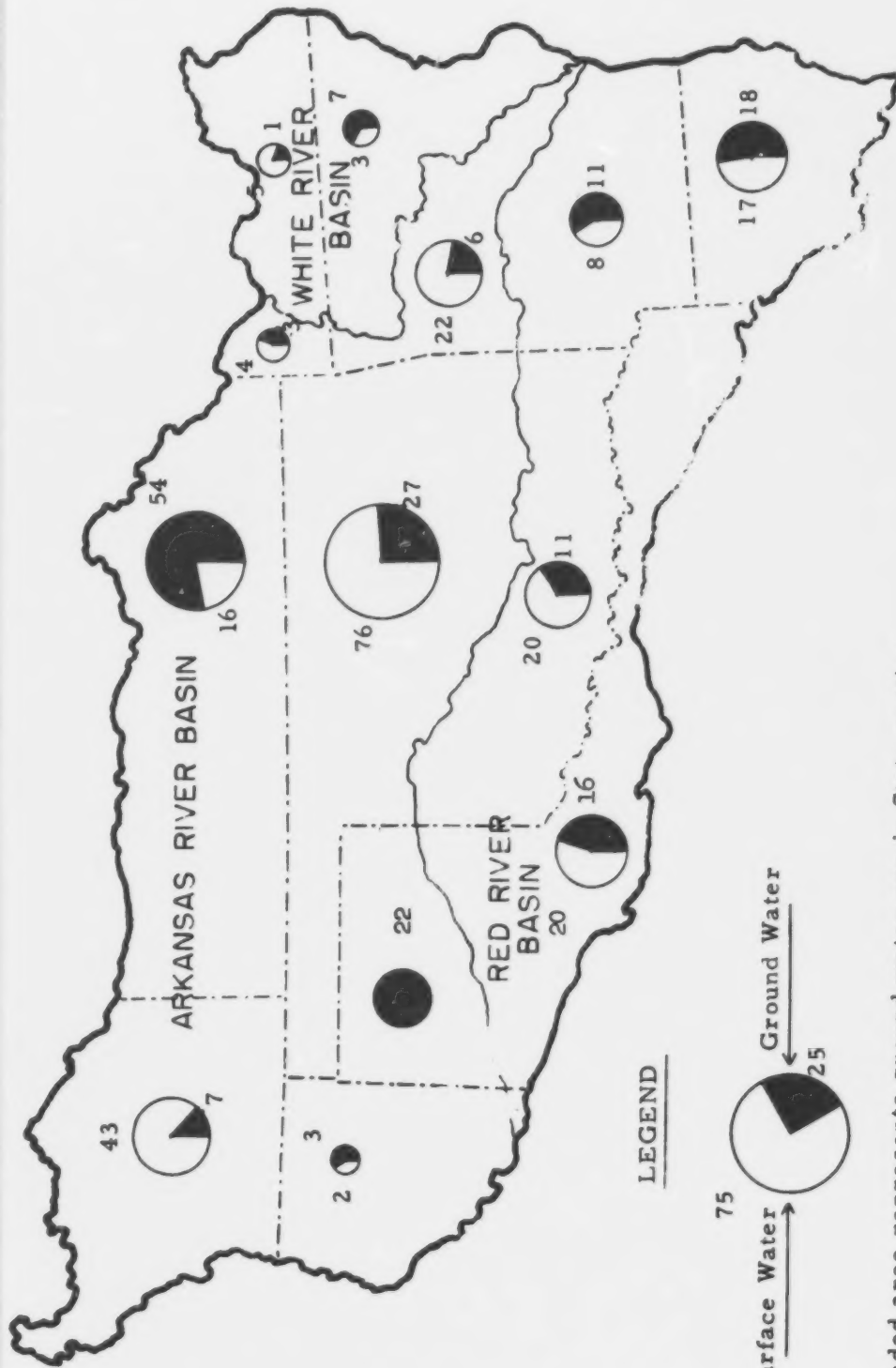
Tables No. 4 to 6, inclusive, give percentage data regarding disinfection, softening, iron removal, and corrosion control for municipal water supplies for each of the three major basins and list comparisons with total United States practice.

Present Quantity and Quality Deficiencies

Information regarding presently recognized quantity and quality deficiencies in water supplies is contained in Appendix B. The Drinking Water Standards, mentioned above, were used for determining a deficiency in quality of the present source of supply. A supply should not be considered as deficient in quality where corrective treatment works on a practical basis could remove the undesirable quality or where blending of two sources of water could reduce undesirable qualities below recommended limits.

Present Quantity and Quality Deficiencies

Information regarding presently recognized quantity and quality deficiencies in water supplies is contained in Appendix B. The Drinking Water Standards, mentioned above, were used for determining a deficiency in quality of the present source of supply. A supply should not be considered as deficient in quality where corrective treatment works on a practical basis could remove the undesirable quality or where blending of two sources of water could reduce undesirable qualities below recommended limits.



Shaded area represents ground water use in State section
 Clear area represents surface water use in State section
 Number adjacent to circle indicates amount of water used (M.G.D.)

Data obtained from "Inventory of Water and Sewage Facilities in the U. S. (1949)", of the Public Health Service.

ARKANSAS-WHITE-RIVER BASINS

MUNICIPAL WATER USE

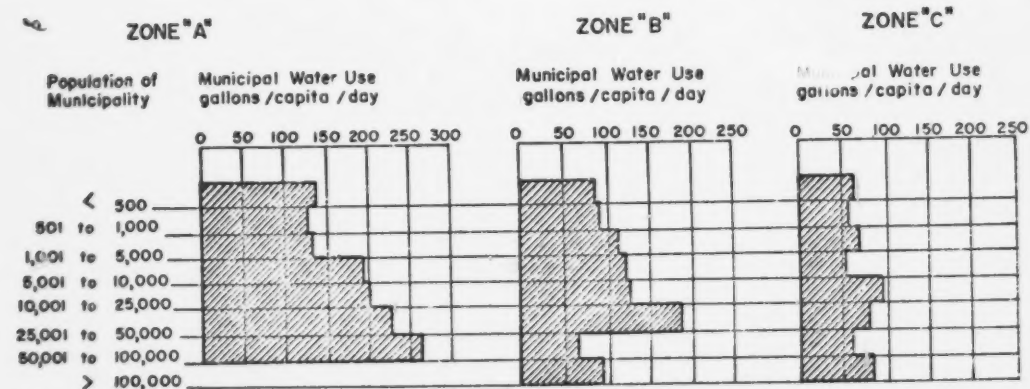
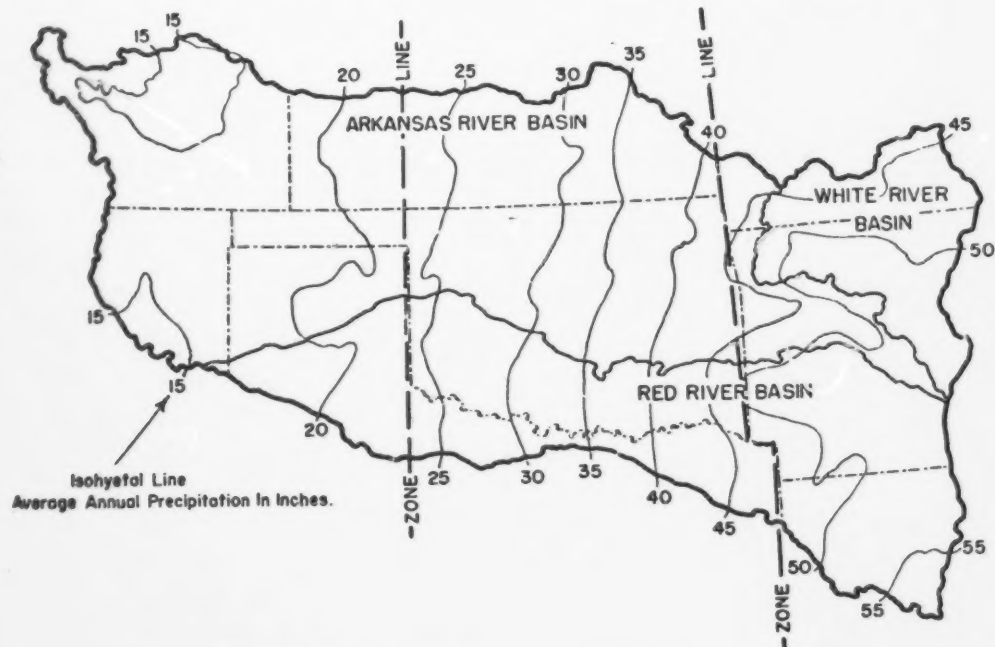
From

GROUND AND SURFACE SOURCES

By

STATE SECTIONS OF DRAINAGE BASINS

FIGURE 1



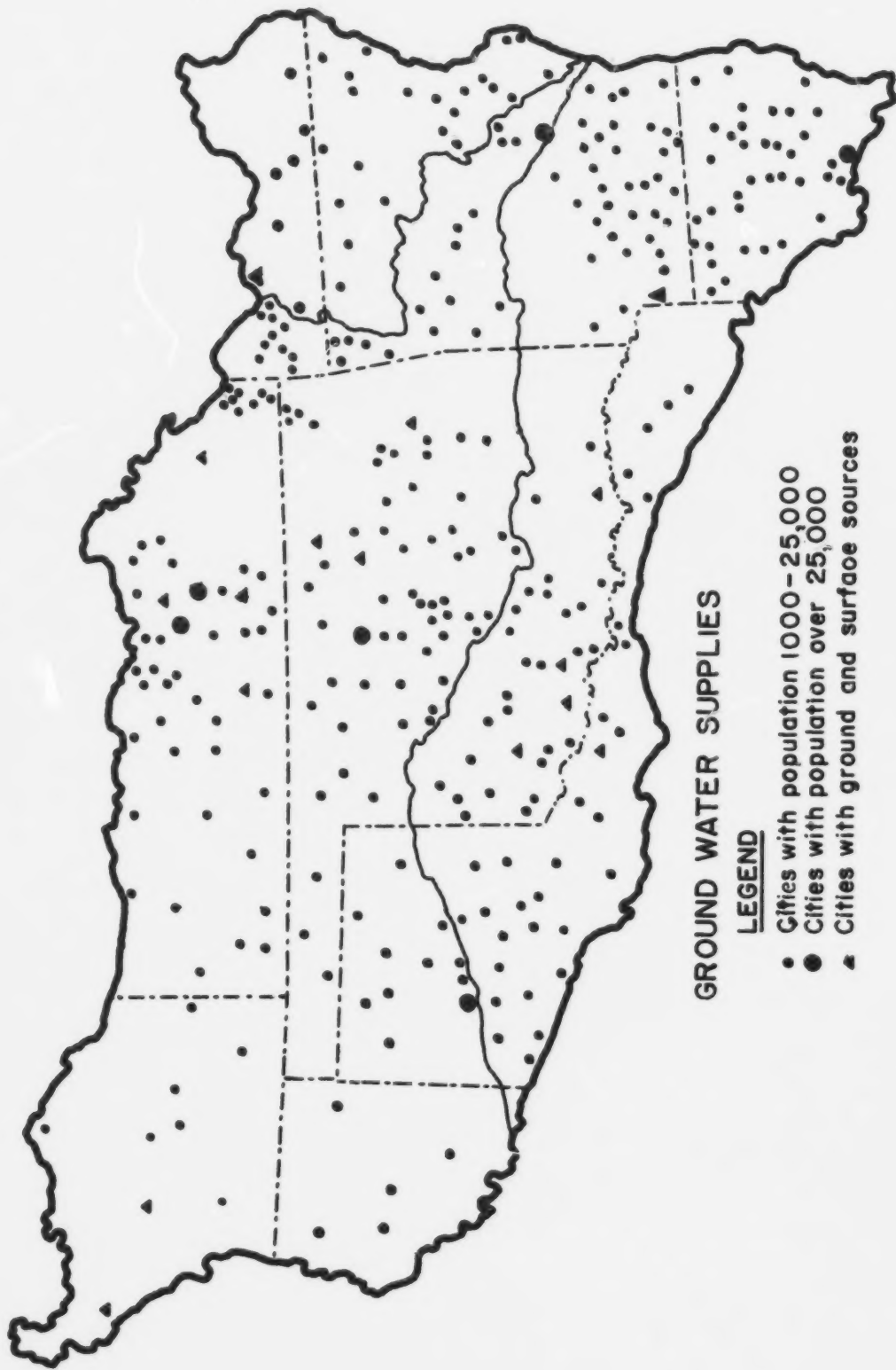
NOTE

Zone "A" Precipitation, in general, less than 20 inches per annum.
 Zone "B" " " " 20 inches to 45 inches per annum.
 Zone "C" " " " more than 45 inches per annum.

Data obtained from "Inventory of Water and Sewage
 Facilities in the U.S. (1949)" of the Public Health Service.

ARKANSAS-WHITE-RED BASINS
 PRESENT MUNICIPAL, PER CAPITA
 WATER USE
 By
 PRECIPITATION ZONES

FIG. NO. 2



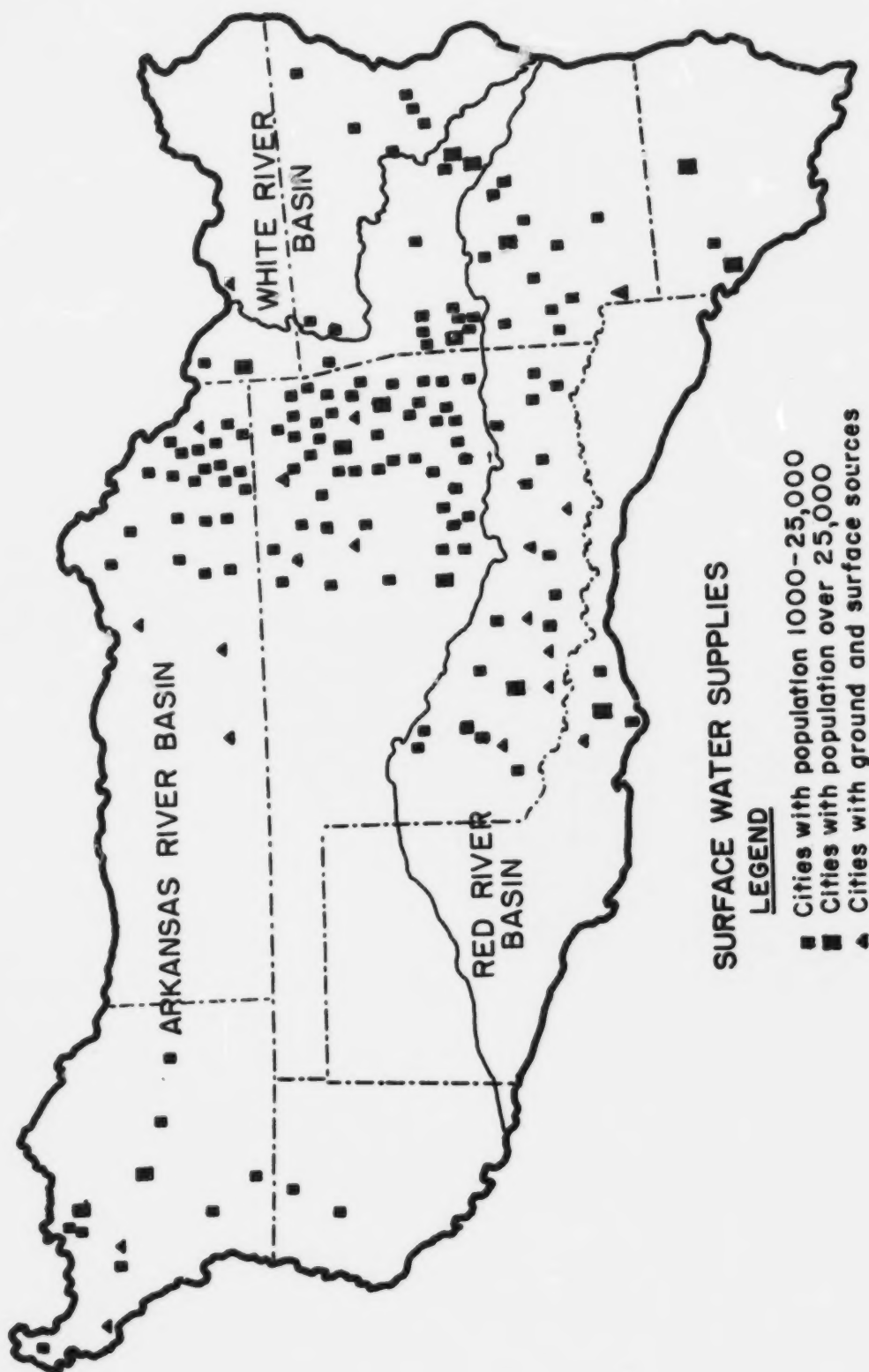
GROUND WATER SUPPLIES

LEGEND

- Cities with population 1000-25,000
- Cities with population over 25,000
- ▲ Cities with ground and surface sources



ARKANSAS RIVER BASIN



SURFACE WATER SUPPLIES

LEGEND

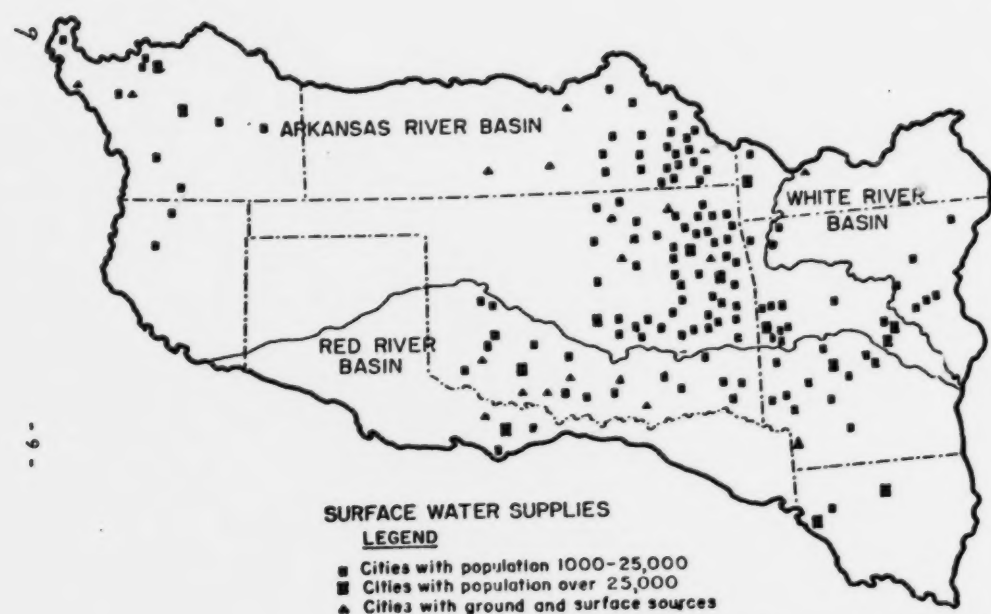
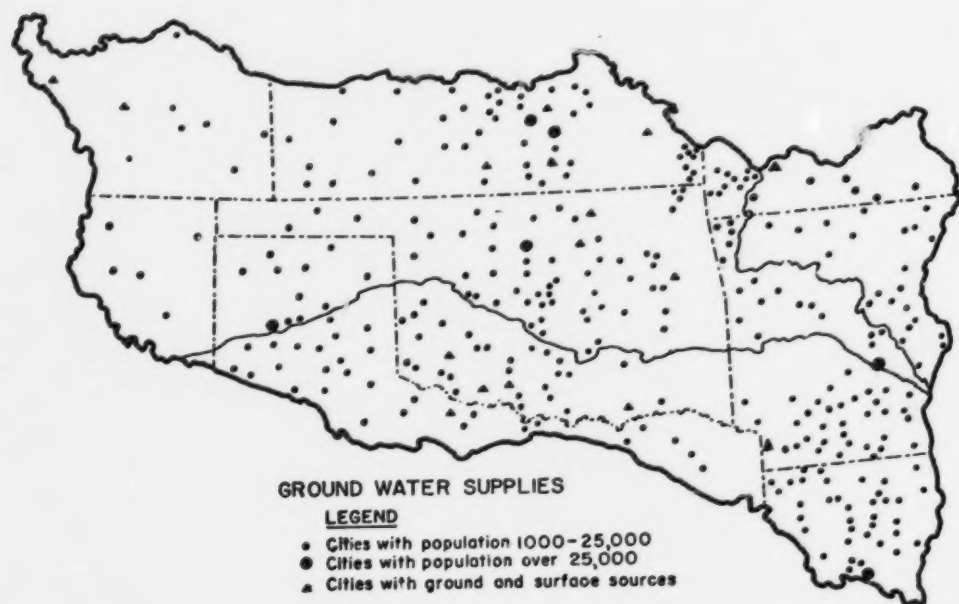
- Cities with population 1000-25,000
- Cities with population over 25,000
- ▲ Cities with ground and surface sources

ARKANSAS-WHITE-RED BASINS

MUNICIPALITIES
USING

GROUND OR SURFACE WATER SOURCES

FIG. NO. 3

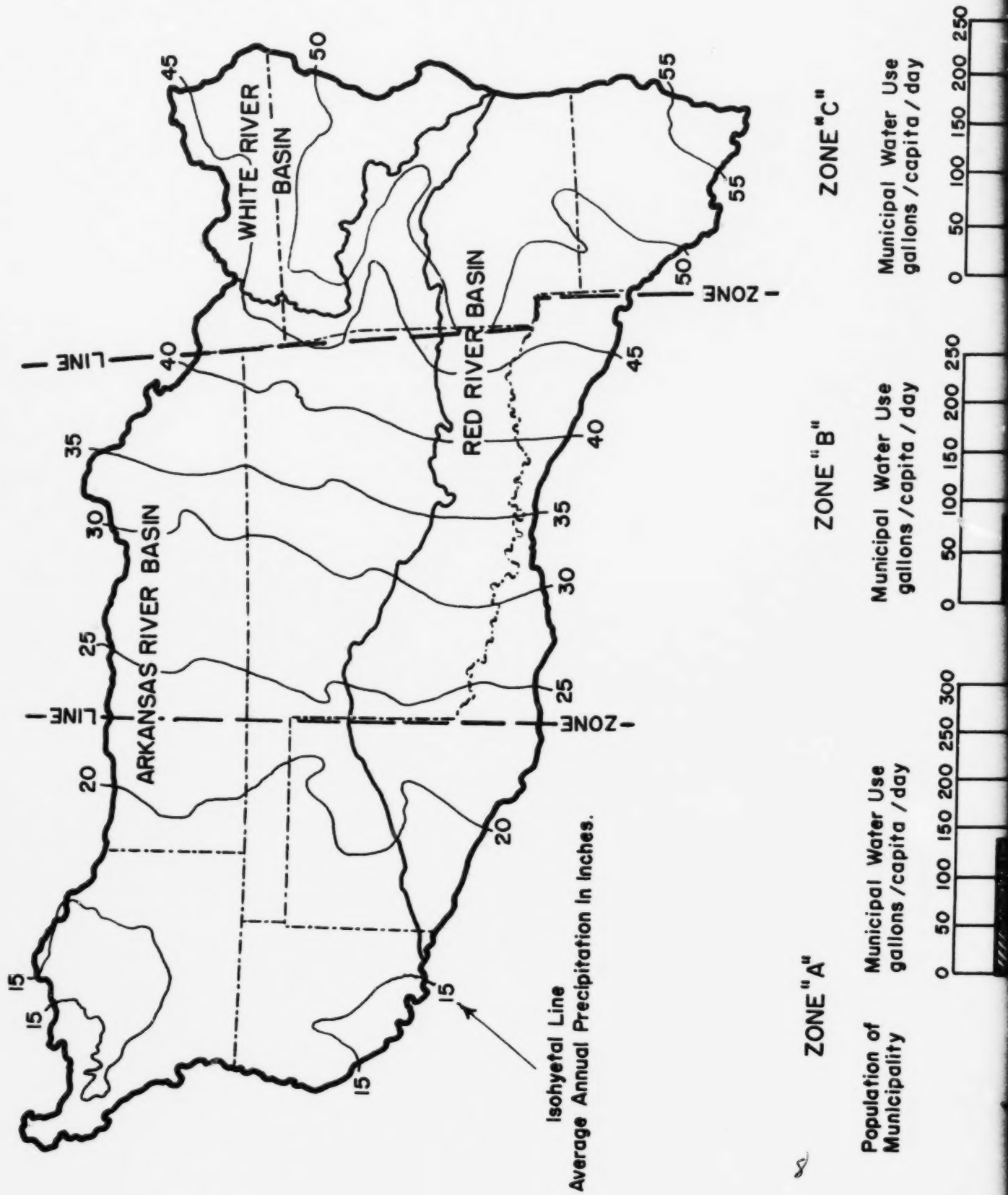


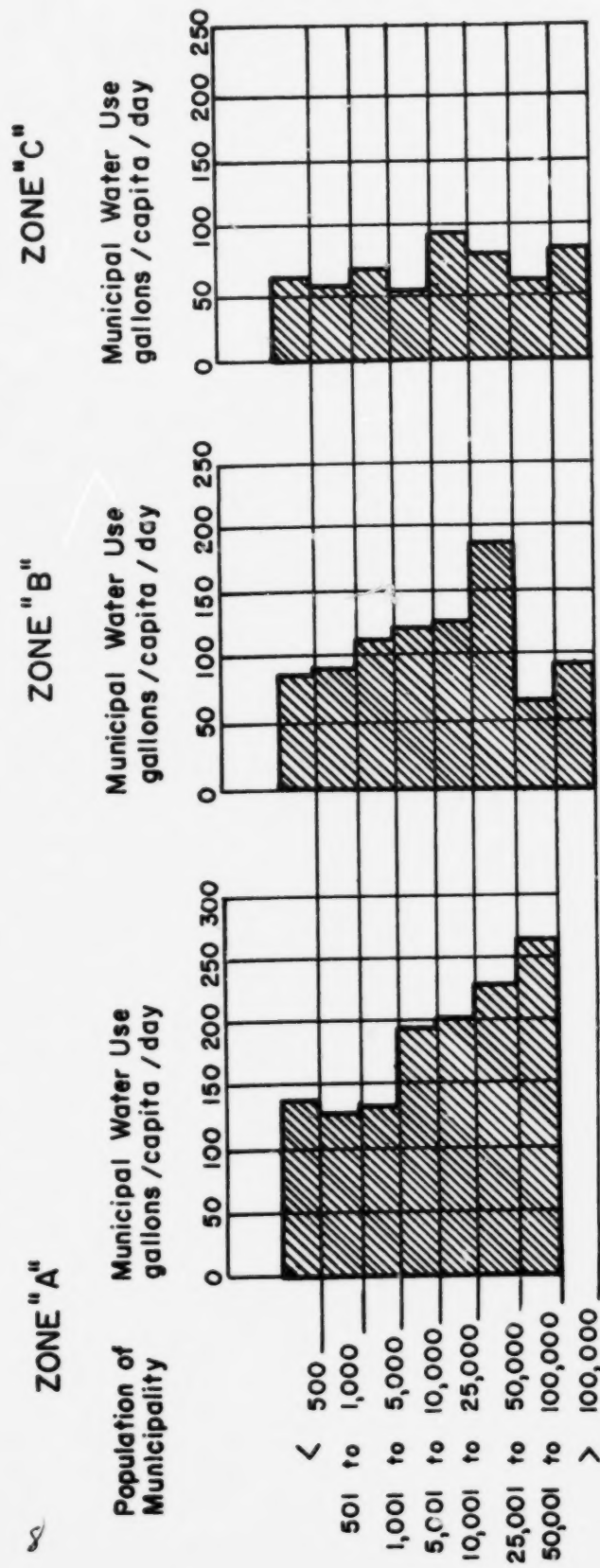
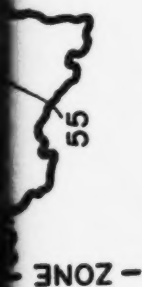
ARKANSAS-WHITE-RED BASINS

MUNICIPALITIES
USING

FIG. NO. 3 GROUND OR SURFACE WATER SOURCES

A





NOTE

Zone "A" Precipitation, in general, less than 20 inches per annum.
Zone "B" " " " 20 inches to 45 inches per annum.
Zone "C" " " " more than 45 inches per annum.

Data obtained from "Inventory of Water and Sewage Facilities in the U.S. (1949)" of the Public Health Service.

ARKANSAS-WHITE-RED BASINS
PRESENT MUNICIPAL, PER CAPITA
WATER USE
By
PRECIPITATION ZONES

22

FIG. NO. 2

TABLE NO. 1

Municipal Water Use (includes some use by industries)
By State Sections of Each Basin

Ground Water Use (M.G.D.)										ATR	
	Ark. Sect.	Colo. Sect.	Kans. Sect.	La. Sect.	Mo. Sect.	N. Mex. Sect.	Okla. Sect.	Tex. Sect.	Basins		
Arkansas Basin	6.2	6.8	54.0	-	2.8	2.7	26.8	22.2	121.5		
White Basin	7.2	-	-	-	1.3	-	-	-	8.5		
Red Basin	11.1	-	-	18.4	-	.01	10.6	15.6	55.7		
Total	24.5	6.8	54.0	18.4	4.1	2.7	37.4	37.8	185.7		

	Surface Water Use (M.G.D.)										
Arkansas Basin	21.9	43.3	15.7	-	3.5	2.0	76.2	-	162.6		
White Basin	3.4	-	-	-	5.0	-	-	-	8.4		
Red Basin	7.8	-	-	16.9	-	-	19.5	19.9	64.1		
Total	33.1	43.3	15.7	16.9	8.5	2.0	95.7	19.9	235.1		

	Total Use (M.G.D.)										
Arkansas Basin	28.1	50.1	69.7	-	6.3	4.7	103.0	22.2	284.1		
White Basin	10.6	-	-	-	6.3	-	-	-	16.9		
Red Basin	18.9	-	-	35.3	-	.01	30.1	35.5	119.8		
Total	57.6	50.1	69.7	35.3	12.6	4.7	133.1	57.7	420.8		
Total State Use	71.6	179.6	146.6	149.3	254.9	56.8	133.1	582.5			
State Sect. Use/Total State Use	80 %	28 %	47 %	24 %	5 %	8 %	100 %	10 %			
State Sect. Area/Total State Area	91 %	26 %	53 %	39 %	18 %	16 %	100 %	16 %			

TABLE NO. 2

Municipal Water Use
(includes some use by industries)

according to Source of Supply
in Gallons per Capita per Day

Area \ Source	Ground Supply	Surface Supply	All Sources
United States	113.8	145.4	135.0
Arkansas Basin	130.9	129.0	130.0
White Basin	77.0	88.9	81.1
Red Basin	90.0	116.9	103.5

TABLE NO. 3

Municipal Water Use

Number of communities and percentage of populations served by ground, surface, and both ground and surface supplies

Basin	Number of communities served by			Percent of total urban population served by		
	Ground sources	Surface sources	Both ground & surface sources	Ground sources	Surface sources	Both ground & surface sources
Arkansas Basin	429	152	10	43.1	55.0	1.9
White Basin	61	9	1	52.8	18.3	28.9
Red Basin	269	52	9	50.1	43.7	6.2
AWR Basins	759	213	20	45.7	49.6	4.7

TABLE NO. 4

Municipal Water Use

Percent of population served by disinfected water supplies by urban population groups

	Less than 500	500 - 1,000	1,000 - 5,000	5,000 - 10,000	10,000 - 25,000	25,000 - 50,000	50,000 - 100,000	More than 100,000	Total
United States	25.8	35.4	58.5	74.3	84.4	90.6	96.0	87.0	86.3
Arkansas Basin	13.5	34.0	69.2	75.8	89.3	81.6	100.0	100.0	83.7
White Basin	17.6	44.9	66.0	81.2	100.0	-	100.0	-	79.3
Red Basin	13.9	21.9	51.9	77.0	87.6	100.0	100.0	-	73.3

TABLE NO. 5

Municipal Water Use

Percent of Communities Served by Disinfected Water Supplies
by
Sources and State Sections

	Arkansas		Colorado		Kansas		Louisiana		Missouri		New Mexico		Oklahoma		Texas		Ark.	
	Ground Sources	Surface Sources	Ground Sources	Surface Sources	Ground Sources	Surface Sources	Ground Sources	Surface Sources	Ground Sources	Surface Sources	Ground Sources	Surface Sources	Ground Sources	Surface Sources	Ground Sources	Surface Sources	Ground Sources	Surface Sources
Arkansas Basin	44	87	12	42	37	89	-	-	17	100	33	80	21	84	29	-	28	79
White Basin	44	100	-	-	-	-	-	-	20	100	-	-	-	-	-	-	34	100
Red Basin	26	92	-	-	-	-	34	67	-	-	-	-	14	86	18	93	22	87

TABLE NO. 6

Municipal Water Use

Percent of total population served by water supplies
treated by softening, iron removal and corrosion control facilities

Area	Proportion of total population served by -		
	Softening %	Iron Removal %	Corrosion Control %
United States	8.9	4.0	19.4
Arkansas Basin	22.7	3.4	23.5
White Basin	1.3	12.8	7.2
Red Basin	1.2	2.7	0.5

APPENDIX A

Inventory of Present Municipal Water Use and Source of Supply for Communities Within AWR Basins Serving Over 1,000 Population ^{1/}

Community	Estimated Pop. Served	Source of Supply	Water Use	
			Avg. Plant Output (MGD)	Per Capita (G.P.D.)
<u>ARKANSAS SECTION</u>				
Alma	1,000	Ft. Smith Impndmt.	---	---
Arkadelphia	7,000	Ouachita River	0.45	64
Ashdown	2,500	Wells	0.20	80
Atkins	1,300	Wells	0.07	54
Augusta	1,800	Wells	0.15	83
Bald Knob	1,800	Searcy (Little Red)	---	---
Batesville	6,300	White River	0.49	78
Bauxite	2,950	Saline River	0.25	85
Bearden	1,100	Well	0.045	41
Beebe	1,500	Well	0.08	53
Benton	5,400	Saline River	0.50	93
Bentonville	3,200	Springs	0.45	141
Berryville	1,500	Springs	0.09	60
Booneville	2,700	Impoundage	0.120	44
Brinkley	3,700	Wells	0.15	41
Cabot	1,600	Well	0.06	38
Calico Rock	1,200	Well	0.07	58
Camden	9,000	Ouachita River	0.95	105
Carlisle	1,200	Wells	0.08	67
Clarendon	2,600	Wells	0.11	42
Clarksville	3,700	Wells	0.40	108
Conway	10,000	Cadron Creek	0.85	85
Corning	1,700	Wells	0.13	76
Cotter	1,000	Well	0.03	30
Cotton Plant	1,000	Well	0.07	70
Crossett	6,000	Wells	2.0	333
Cullendale	1,000	Wells	0.05	50
Dardanelle	2,500	Wells	0.15	60
DeQueen	4,000	Wells	0.30	75
Dermott	3,000	Wells	0.20	67
Des Arc	1,500	Well	0.05	33

^{1/} Developed from the basic water supply data contained in the "Inventory of Water and Sewage Facilities of the United States (1949)" compiled by the Public Health Service in cooperation with the State Health Departments.

Community	Estimated Pop. Served	Source of Supply	Water Use	
			Avg. Plant Output (MGD)	Per Capita (G.P.D.)

ARKANSAS SECTION (Cont'd)

DeWitt	2,800	Well	0.08	29
Dierks	1,500	Holly Cr.(Imp.)	0.18	120
Dumas	2,200	Wells	0.14	64
El Dorado	20,000	Deep Wells	2.00	100
England	2,500	Wells	0.23	92
Eudora	1,700	Wells	0.10	59
Eureka Springs	2,600	Leatherwood Cr.(Imp.)	0.10	38
Fayetteville	15,000	West Fork R. (Imp.)	1.30	87
Fordyce	4,000	Wells	0.20	50
Forester	1,300	Wells	0.07	54
Fort Smith	80,000	Clear Creek (Imp.)	6.00	75
Glenwood	1,000	Caddo River	0.05	50
Gravette	1,100	Well	0.04	36
Greenwood	1,000	Imp. Res. - Creeks	0.04	40
Gurdon	2,000	Wells	0.125	63
Hamburg	1,900	Well	0.10	53
Harrison	6,000	Spring	0.6	100
Heber Springs	1,500	Little Red River	0.16	107
Helena	9,000	Wells	1.30	145
Hope	10,400	Wells	0.60	58
Hot Springs	42,000	Imp. & Bulls Bayou	3.80	90
Hoxie	1,000	Wells	0.05	50
Huttig	2,000	Wells	0.11	55
Jonesboro	20,000	Wells	1.70	85
Judsonia	1,400	Searcy (Little Red R.)	---	---
Junction City	1,500	Well	0.07	47
Lewisville	1,200	Wells	0.06	50
Levy	--	Little Rock	---	---
Lincoln	1,000	Spring	0.046	46
Little Rock	155,000	Imp. on Saline River	13.00	84
Lonoke	2,500	Wells	0.15	60
Louann	1,500	Well	0.06	40
Magnolia	10,000	Wells	0.50	50
Malvern	5,500	Ouachita River	0.50	91
Marshall	1,200	Wells & Spring	0.04	33
McGehee	5,100	Wells	0.28	55
Mena	3,500	Ward Creek (Imp.)	0.20	57
Military Heights	--	Little Rock (Imp.)	---	---
Monticello	5,000	Wells	0.25	50
Morrilton	5,000	Wells	0.333	67

Community	Estimated Pop. Served	Source of Supply	Water Use	
			Avg. Plant Output (MGD)	Per Capita (G.P.D.)

ARKANSAS SECTION (Cont'd)

Mountain Home	2,500	Deep Wells	0.125	50
Mountain Pine	1,200	Glaze Pean Cr. (Imp.)	0.36	50
Hulberry	1,000	Big Hulberry Creek	0.07	70
Murfreesboro	1,600	Well	0.06	38
Nashville	2,500	Imp.Res. on Mine Cr.	0.20	80
Newport	--	White River Emergency	0.50	--
No. Little Rock (36,000)		Little Rock (Imp.)	1.76	49
Ozark	1,800	Wells	0.045	25
Paris	8,000	Imp.Res. on Short Mt.Cr.	0.25	31
Park Hill*	1,500	Little Rock (Imp.)	---	--
Pine Bluff	33,000	Wells	2.7	82
Pocahontas	4,000	Black River	0.36	90
Prescott	4,000	Wells	0.40	100
Rison	1,000	Well	0.055	55
Rogers	6,000	Springs	0.50	83
Russellville	6,500	Imp.Res.on Little Ill.R.	0.680	105
Searcy	8,800	Little Red River	0.10	11
Sheridan	1,300	Wells	0.125	96
Siloam Springs	3,000	Flint Creek (Imp.)	0.53	177
Smackover	4,000	Wells	0.25	63
Sparkman	1,000	Deep Wells	0.05	50
Springdale	5,700	Spring	0.60	105
Stamps	2,500	Wells	0.15	60
Star City	1,500	Springs	0.10	67
Stephens	1,100	Deep Wells	0.10	91
Stuttgart	7,000	Wells	0.50	71
Texarkana (Ark.)	--	Wells	---	--
Texarkana (Tex.#1)	30,000	Wells & Imp. Res.	3.50	117
Texarkana (Tex.#2)	--	Wells (Emerg. only)	---	--
Van Buren	7,000	Fort Smith (Imp.)	0.50	71
Waldo	1,200	Wells	0.066	55
Waldron	2,500	Square Rock Cr.(Imp.)	0.175	70
Walnut Ridge	2,000	Wells	0.21	105
Warren	4,500	Wells	0.30	67
West Helena	6,000	Wells	0.45	75

* Annexed to North Little Rock - 1946.

APPENDIX A

Inventory of Present Municipal Water Use and Source of Supply for Communities Within AWR Basins Serving Over 1,000 Population ^{1/}

Community	Estimated Pop. Served	Source of Supply	Water Use	
			Avg. Plant Output (MGD)	Per Capita (G.P.D.)
<u>COLORADO SECTION</u>				
Aguilar	1,400	2 springs; 1 well	0.06	43
Canon City*	10,000	Arkansas River	2.50	250
Colorado Springs	45,269	Mt. stream - imp.	10.00	221
Florence	2,500	Spring and creek	0.50	200
Green Mountain Falls	2,500	Creek	---	---
Holly	1,500	Deep wells	0.13	87
La Junta	7,900	Wells	2.00	253
Lamar	5,468	Wells on Clay Cr.	1.00	183
Las Animas	2,422	Wells	1.50	620
Leadville	3,996	Big Evans Creek	0.138	35
Limon	1,500	Wells	0.15	100
Manitou Springs	1,850	French Creek	1.00**	541
Ordway	1,200	Wells	0.20	167
Pueblo #1	63,561	Ark. River & wells	13.00	378
#2		Ark. River	11.00	
Rocky Ford	5,000	Ark. River	1.50	300
Salida	4,516	S. Fork of Ark. R.	1.50	333
Springfield	1,125	Wells	0.25	222
Trinidad	11,600	N. Park Lane & Cr.	4.00	345
Walsenburg	5,570	Cucharas River	1.57	282

^{1/} Developed from the basic water supply data contained in the
"Inventory of Water and Sewage Facilities of the United States
(1949)" compiled by the Public Health Service in cooperation with
the State Health Departments.

* Also serves Colorado State Penitentiary.

** Summer consumption.

APPENDIX A

Inventory of Present Municipal Water Use and Source of Supply for Communities Within AWR Basins Serving Over 1,000 Population ^{1/}

Community	Estimated Pop. Served	Source of Supply	Water Use	
			Avg. Plant Output (MGD)	Per Capita (G.P.D.)
<u>KANSAS SECTION</u>				
Anthony	2,250	Shallow wells	0.30	134
Arkansas City	11,000	Shallow wells	1.50	136
Arma	1,200	Deep wells	0.04	33
Ashland	1,200	Shallow well	0.20	167
Augusta	3,200	Imp. Reservoir	0.35	110
Baxter Springs	4,800	Deep wells	0.35	73
Burlington	1,800	Neosho River	0.15	83
Caldwell	1,750	Shallow wells	0.25	143
Caney	2,300	Little Caney River	0.22	96
Chanute	9,300	Neosho River	0.80	86
Cherokee	1,000	Deep wells	0.08	80
Cherryvale	3,100	Verdigris River	0.23	74
Chetopa	1,350	Neosho River	0.05	37
Coffeetown	18,000	Verdigris River	2.50	139
Columbus	3,000	Deep wells	0.35	117
Cottonwood Falls	1,000	Shallow wells	0.08	80
Council Grove	2,200	Mun. lake; Neosho R. (emerg.)	0.50	227
Dodge City	7,600	Deep wells	2.00	263
El Dorado	8,000	Imp. Res.	0.75	94
Ellinwood	1,200	Deep wells	0.16	133
Emporia	12,000	Neosho R. (imp.)	2.00	167
Erie	1,100	Neosho R. & shallow well	0.21	191
Eureka	3,200	Lake Eureka	0.25	78
Fredonia	3,400	Fall R. (imp.)	0.50	147
Frontenac	1,700	Deep wells	0.13	76
Galena	3,400	Deep well	0.40	118
Garden City	6,000	Deep wells	0.96	160
Girard	2,500	Deep wells	0.30	120

^{1/} Developed from the basic water supply data contained in the
"Inventory of Water and Sewage Facilities of the United States
(1949)" compiled by the Public Health Service in cooperation with
the State Health Departments.

Community	Estimated Pop. Served	Source of Supply	Water Use	
			Avg. Plant Output (MGD)	Per Capita (G.P.D.)
KANSAS SECTION (cont'd)				
Great Bend	8,000	Deep & shallow wells	1.55	194
Greensburg	1,100	Deep wells	0.19	173
Halstead	1,300	Deep wells	0.17	131
Harper	1,300	Shallow wells	0.38	292
Hillsboro	1,200	Shallow wells	0.20	167
Hoisington	3,000	Shallow wells	0.28	93
Howard	1,000	Imp. Res.	0.09	90
Hugoton	1,100	Deep wells	0.13	118
Humboldt	1,950	Neosho R.	0.25	128
Hutchinson	25,000	Shallow wells	5.00	200
Independence	14,000	Elk R. (Imp.) & Verdigris R. (Imp.)	1.75	125
Iola	6,000	Neosho R.	0.70	117
Kingman	2,500	Springs & shallow wells	0.36	144
Kinsley	1,800	Shallow wells	0.30	167
Kiowa	1,435	Shallow wells	0.18	126
La Crosse	1,500	Deep wells	0.10	67
Larned	3,100	Deep & shallow wells	0.75	242
Liberal	6,000	Deep wells	1.50	250
Lyons	3,800	Shallow wells	1.50	395
Mc Pherson	6,500	Deep wells	1.50	231
Marion	1,600	Shallow wells & Mud Cr. (Imp.)	0.30	188
Meade	1,000	Deep Well	0.40	400
Medicine Lodge	1,500	Inf. gal. & shallow well	0.50	333
Mulberry	1,000	Deep wells	0.05	50
Mulvane	1,200	Shallow wells	0.13	108
Neodesha	3,500	Fall R. (Imp.)	0.80	229
Ness City	1,100	Shallow wells	0.10	91
Newton	10,500	Deep wells	2.00	190
Oswego	2,000	Neosho R.	0.20	100
Parsons	13,000	Labette Cr. & Neosho River (aux.)	2.50	192
Peabody	1,100	Shallow wells	0.07	64
Pittsburg	18,500	Deep wells	2.00	108
Pratt	6,000	Shallow wells	2.25	375

Community	Estimated Pop. Served	Source of Supply	Water Use	
			Avg. Plant Output (MGD)	Per Capita (G.P.D.)

KANSAS SECTION (cont'd)

St. John	1,300	Shallow well	0.13	100
Scott City	1,400	Shallow well	0.19	136
Sedan	1,400	Reservoir (imp.)	0.15	108
Stafford	1,300	Shallow well	0.20	154
Sterling	1,750	Shallow wells	0.50	286
Syracuse	1,100	Shallow well	0.45	410
Ulysses	2,000	Deep wells	0.80	400
Weir	1,000	Deep wells	0.08	80
Wellington	7,000	Imp. res. & shallow well	0.75	107
Wichita	205,000	Deep and shallow wells	19.00	93
Winfield	9,200	Shallow wells	1.13	123
Yates Center	1,500	Imp. res.	0.06	40

APPENDIX A

Inventory of Present Municipal Water Use and Source of Supply for Communities Within AWR Basins Serving Over 1,000 Population ^{1/}

Community	Estimated Pop. Served	Source of Supply	Water Use	
			Avg. Plant Output (MGD)	Per Capita (G.P. .)
<u>LOUISIANA SECTION</u>				
Alexandria	60,000	Wells	4.00	67
Arcadia	2,500	Wells	0.15	60
Bastrop	7,500	Wells	0.45	60
Bossier City	11,000	Shreveport	1.50	136
Brownsville	1,400	Well	--	--
Clarks	3,000	Wells	0.86*	287
Colfax	1,750	Wells	0.04	23
Columbia	1,500	Well	0.09	60
Cotton Valley	1,150	Wells	0.035	30
Coushatta	2,000	Wells	0.08	40
Cullen	1,200	Wells	0.06	50
Dixie	6,000	Wells	0.40	67
Farmerville	1,500	Wells	0.20	133
Ferriday	3,200	Wells	0.30	94
Gibbsland	1,850	Well	0.05	27
Haynesville	4,000	Wells	0.275	69
Hodge	2,300	Wells	0.40	174
Homer	3,400	Wells	0.60	177
Jena	2,000	Wells	0.15	75
Jonesboro	4,000	Wells	0.50	125
Jonesville	1,700	Wells	0.10	59
Langham	1,000	Wells	0.05	50
Marksville	1,900	Wells	0.13	68
Minden	10,000	Wells	1.80	180
Monroe	35,000	Bayou DeSiard	3.5	100

^{1/} Developed from the basic water supply data contained in the
"Inventory of Water and Sewage Facilities of the United States
(1949)" compiled by the Public Health Service in cooperation
with the State Health Departments.

* Includes industrial use.

Community	Estimated Pop. Served	Source of Supply	Water Use	
			Avg. Plant Output (MGD)	Per Capita (G.P.D.)

LOUISIANA SECTION (Cont'd)

Natchitoches	10,000	Wells	0.65	65
Oak Grove	1,400	Well	0.15	107
Olla	1,200	Wells	0.05	42
Plain Dealing	1,200	Wells	0.04	33
Pineville	6,000	Wells	0.25	42
Rayville	3,500	Wells	0.30	86
Ringgold	2,000	Wells	0.15	75
Ruston	10,000	Wells	1.25	125
Shreveport	(150,000)	—	13.405	89
- McNeil St. Plant	()	Cross Lake (Cross Bayou Imp.)		
- Cross Lake Plant	()	Cross Lake	--	--
Springhill	6,000	Wells	0.20	33
Sterlington	1,200	Wells	0.15	125
Tallulah	5,000	Wells	0.21	42
Vivian	2,500	Wells	0.25	100
West Monroe	12,000	Wells	1.75	146
Winnfield	5,000	Wells	0.37	74
Winnsboro	2,800	Wells	0.30	107
Wisner	1,200	Well	0.05	42
Zimmerman	1,200	Well	0.03	25

APPENDIX A

Inventory of Present Municipal Water Use and Source of Supply for Communities Within AWR Basins Serving Over 1,000 Population ^{1/}

Community	Estimated Pop. Served	Source of Supply	Water Use	
			Avg. Plant Output (MGD)	Per Capita (G.P.D.)
<u>MISSOURI SECTION</u>				
Aurora	3,900	Drilled wells	0.30	77
Ava	1,250	Drilled wells	0.125	100
Carthage	10,500	Drilled wells	0.600	57
Cassville	1,150	Drilled well	0.066	57
Doniphan	1,600	Inf. well	0.175	109
Granby	1,100	Drilled well	0.04	36
Joplin	34,000	Shoal Creek	3.25	96
Lamar	2,700	Muddy Creek	0.25	93
Marionville	1,000	Drilled well	0.05	50
Monett	4,200	Drilled wells	0.35	83
Mt. Vernon	1,600	Drilled wells	0.225	141
Neosho	10,000	Drilled wells	---	---
Sarcoie	1,400	Drilled well	0.035	25
Seneca	1,000	Drilled well	0.05	50
Springfield	60,000	Imp. res., drilled wells & spring	5.00	83
Thayer	1,300	Drilled wells	0.035	27
Webb City	6,700	Drilled wells	0.215	32
West Plains	3,500	Drilled wells	0.300	83
Willow Springs	1,500	Drilled wells	0.075	50

^{1/} Developed from the basic water supply data contained in the
"Inventory of Water and Sewage Facilities of the United States
(1949)" compiled by the Public Health Service in cooperation with
the State Health Departments.

APPENDIX A

Inventory of Present Municipal Water Use and Source of Supply for Communities Within AWR Basins Serving Over 1,000 Population ^{1/}

Community	Estimated Pop. Served	Source of Supply	Water Use	
			Avg. Plant Output (MGD)	Per Capita (G.P.D.)
<u>NEW MEXICO SECTION</u>				
Clayton	3,620	Deep Wells	0.25	69
Dawson	1,400	Wells	0.48	343
Raton	9,000	Imp. Res.	1.80	200
Roy	1,250	Wells	0.03	24
Springer	1,800	Irrigation Water (Imp.)	0.10	56
Tucumcari	9,500	Wells	1.15	121
Wagon Mound	1,000	Springs	0.20	200

^{1/} Developed from the basic water supply data contained in the
"Inventory of Water and Sewage Facilities of the United States
(1949)" compiled by the Public Health Service in cooperation
with the State Health Departments.

APPENDIX A

Inventory of Present Municipal Water Use and Source of Supply for Communities Within AWR Basins Serving Over 1,000 Population 1/

Community	Estimated Pop. Served	Source of Supply	Water Use	
			Avg. Plant Output (MGD)	Per Capita (G.P.D.)
OKLAHOMA*				
Ada	16,845	Byrd Mill Spring	4.0	238
Afton	1,282	Wells	---	---
Allen	1,271	Wells	0.058	46
Altus	9,835	Lugert Dam	1.31	134
Alva	6,730	Wells	---	---
Anadarko	6,284	Washita River	0.634	101
Antlers	2,506	Kiamichi River	0.076	30
Apache	1,190	Wells	---	---
Ardmore	17,890	City lake	1.608	90
Atoka	2,953	Muddy Boggy Cr.	0.245	83
Barnsdall	1,714	Bird Creek	0.10	58
Bartlesville	22,200	Lake Hudson & Caney River	1.65	74
Beaver	1,495	Wells	0.164	110
Beggs	1,314	City Res.	0.069	53
Bethany	5,905	Wells	---	---
Bixby	1,547	Springs & well	0.37	240
Blackwell	9,250	Imp. res. and Chikaskia R.	1.23	133
Blanchard	1,311	Wells	---	---
Bristow	5,575	Wells	---	---
Britton	2,240	Well	---	---
Broken Arrow	3,562	Springs	0.211	59
Broken Bow	1,938	City res.	0.11	57
Buffalo	1,635	Springs	---	---

1/ Developed from the following sources:

- "Inventory of Water and Sewage Facilities of the United States (1949)" compiled by the Public Health Service in cooperation with the State Health Departments.
- "Public Water Supplies in Oklahoma" (1950 data) by U. S. Geological Survey in cooperation with Oklahoma Planning and Resources Board.

*1950 data.

Community	Estimated Pop. Served	Source of Supply	Water Use	
			Avg. Plant Output (MGD)	Per Capita (G.P.D.)
OKLAHOMA (cont'd)				
Carnegie	1,870	Wells	0.20	107
Chandler	2,718	Wells	0.167	61
Checotah	2,638	Surface water	0.186	71
Choisac	1,437	Imp. res. & Pryor Creek	0.06	42
Cherokee	2,670	Wells	---	---
Chickasha	16,350	Washita River	1.67	102
Claremore	5,544	Dog Creek (imp.)	0.352	63
Cleveland	2,624	City reservoir	0.270	103
Clinton	8,555	Lake Clinton	1.11	130
Coalgate	2,049	Wells	0.0604	29
Collinsville	2,060	Caney River	0.06	29
Comanche	2,083	Lake Comanche	0.125	60
Commerce	2,740	Wells	---	---
Cordell	2,930	Imp. reservoir	0.30	102
Coweta	1,655	Spring & imp. res.	0.27	163
Crescent	1,338	Wells	---	---
Cushing	9,830	Lake Cushing	1.21	123
Davis	1,928	Well	0.165	86
Dawson	1,086	Tulsa supply	---	---
Decey	2,763	Caney R. & wells	0.107	39
Del City	2,504	Wells	---	---
Drumwright	5,400	Wells	---	---
Duncan	15,325	Well & Fitzpatrick Cr. (imp.)	1.50	98
Durant	11,100	Blue River & wells	2.00	160
Edmond	6,186	Wells	0.62	100
Elk City	8,160	Wells	0.821	100
El Reno	12,500	Wells	1.35	108
Enid	36,040	Wells	---	---
Erick	1,600	Wells	---	---
Eufaula	2,740	Wells	0.157	57
Fairfax	2,050	City reservoir	0.164	78
Fairview	2,446	Wells	---	---
Fort Gibson	1,460	Neosho R.	0.15	103
Frederick	5,567	Wells	0.45	81
Geary	1,614	Wells	0.125	77
Grandfield	1,982	Wells	0.219	110
Guthrie	10,294	Cottonwood Cr. & Lake Guthrie	0.705	69

Community	Estimated Pop. Served	Source of Supply	Water Use	
			Avg. Plant Output (MGD)	Per Capita (G.P.D.)

OKLAHOMA (cont'd)

Guymon	4,718	Wells	0.688	146
Haileyville	1,107	Hartshorne	0.0557	50
Hartshorne	3,730	Lake Savage	0.30	79
Haskell	1,776	Wells	---	---
Healdton	2,728	Wells	---	---
Heavener	2,403	Surface	0.205	85
Hennessey	1,204	Wells	---	---
Henryetta	10,000	Wolf Creek (imp.)	0.853	85
Hobart	5,480	Little Elk Creek	0.853	146
Holdenville	6,192	Holdenville Lake	0.529	85
Hollis	3,240	Springs & wells	---	---
Honoring	2,802	Penn. Creek (imp.)	0.20	71
Hooker	1,842	Wells	---	---
Hugo	6,134	Wells	0.661	108
Idabel	4,771	Surface	---	---
Jerks	1,115	Well	0.143	129
Kingfisher	3,375	Wells	0.297	88
Konawa	2,713	Wells	---	---
Krebs	1,607	Lake	0.0228	14
Lawton	43,470	Lake Lawtonka; Medi- cine Bluff Cr. & wells	8.101	187
Lindsay	3,371	Wells	0.125	37
Madill	2,791	Mill Cr. (imp.)	0.40	144
Mangum	4,286	Wells	0.80	187
Marietta	2,175	Wells	---	---
Marlow	3,499	Wells	0.40	115
Maud	1,389	Wells	---	---
McAlester	17,978	City res., Bull Cr.	1.775	99
Medford	1,581	Well	---	---
Midwest City	10,246	Wells	---	---
Miami	11,900	Wells	0.894	75
Morris	1,322	City reservoir	0.0644	49
Muskogee	42,300	Neosho R.	5.085	120
Newkirk	2,260	Reservoir (imp.)	0.227	100
Nichols Hills	2,626	Wells	---	---
Norman	15,000	Wells	1.254	84
Nowata	4,315	Verdigris River	0.350	81
Okemah	3,480	Wells	0.298	86
Oklahoma City		N. Canadian R. (imp.)		
Okla. City #2	850,000	N. Canadian R. (imp.)	22.58	90

Community	Estimated Pop. Served	Source of Supply	Water Use	
			Avg. Plant Output (MGD)	Per Capita (G.P.D.)

OKLAHOMA (cont'd)

Okmulgee	18,817	Lake Okmulgee	2.057	109
Pauls Valley	7,021	Wells	0.15	21
Pawhuska	6,280	Imp. reservoir	1.102	176
Pawnee	2,886	Skeedee Cr. (imp.)	0.354	123
Perry	5,262	Cow Creek & imp. res.	0.651	124
Picher	4,070	Wells	0.40	98
Ponca City	20,480	Turkey Cr. imp. & wells	4.497	220
Poteau	4,876	Poteau R.	0.322	66
Prague	1,549	Wells	0.0919	59
Pryor	4,516	Neosho R.	0.501	111
Purcell	3,571	Wells	0.175	49
Rush Springs	1,490	Well	0.27	181
Sallisaw	2,935	Sallisaw Creek	0.200	68
Sand Springs	6,994	Shell Creek Lake	3.859	550
Sapulpa	13,630	Tulsa		
		Rock Cr. thru imp. @ Sahoma Lake	0.984	72
Sayre	3,437	Wells	0.37	108
Seminole	13,160	Wells	---	---
Sentinel	1,231	Wells	0.09**	73
Shattuck	1,752	Wells	---	---
Shawnee	24,950	Shawnee Lake, South Fork of Deer Cr.	1.679	67
Skiatook	2,260	Tulsa	0.107	47
Snyder	1,696	Surface & wells	0.09	53
Spiro	1,500	City lake	0.247	165
Stigler	1,913	City lake	0.08	42
Stillwater	21,140	Surface; aux. wells	2.14	101
Stilwell	1,963	Starr Springs	---	---
Stroud	2,450	Wells	0.131	53
Sulphur	4,557	Wells	0.446	98
Tahlequah	4,900	Illinois River	0.672	137
Talihina	1,965	Lake Talihina	0.075	38
Tecumseh	2,425	City reservoir	0.125	52
Temple	1,462	City res. & wells	0.070	48
Thomas	1,113	Wells	0.055	50
Tipton	1,148	Wells	---	---
Tishomingo	2,355	Spring and lake	---	---

**Summer

Community	Estimated Pop. Served	Source of Supply	Water Use	
			Avg. Plant Output (MGD)	Per Capita (G.P.D.)
<u>OKLAHOMA</u> (cont'd)				
Tonkawa	3,663	Wells	---	---
Tulsa	220,300	Lake Spavinaw (Spavinaw Cr.)	23.47	106
Vinita	5,718	Grand Lake	0.688	120
Wagoner	4,100	Neosho R. thru imp.	0.559	82
Walters	3,940	Lake; aux. well	0.215	70
Watonga	3,289	Wells	0.357	109
Waurika	2,362	Wells	0.12	51
Waynoka	1,950	Well	---	---
Weatherford	3,585	Wells	---	---
Weleetka	1,548	Weleetka Lake	0.15	97
Wetumka	2,025	Lake Wetumka	0.20	99
Wewoka	6,747	Lake Wewoka	0.451	67
Wilburton	1,939	Fourche Meline Cr.	0.125	65
Wilson	1,600	Wells	---	---
Woodward	6,240	Wells	---	---
Wright City	1,121	Little River	0.09	80
Wynnewood	2,433	Wells	---	---
Yale	1,500	Wells	0.06	40
Yukon	1,990	Wells	---	---

APPENDIX A

Inventory of Present Municipal Water Use and Source of Supply for Communities Within A/R Basins Serving Over 1,000 Population ^{1/}

Community	Estimated Pop. Served	Source of Supply	Water Use	
			Avg. Plant Output (MGD)	Per Capita (G.P.D.)
TEXAS SECTION*				
Amarillo	80,000	Wells	12.50	156
Archer City	2,500	Imp. Res. & Lake	0.185	74
Atlanta	3,500	Wells	0.28	80
Bonham	6,500	Wells	0.70	108
Borger**	18,000	Wells	15.00	83
Burkburnett	2,800	Wells	0.30	107
Canadian	3,000	Wells	0.52	173
Canyon	3,600	Wells	0.35	97
Childress	9,000	Wells-Lake	0.90	100
Chillicothe	1,400	Wells	0.20	143
Clarendon	3,000	Wells	0.40	133
Clarksville	4,000	Wells	0.33	83
Claude	1,000	Wells	0.10	100
Commerce	5,000	Wells	0.40	80
Cooper	2,500	Imp. Res.	0.19	76
Crowell	2,000	Wells	0.28	140
Daingerfield	1,200	Well	0.11	92
Dalhart	9,000	Wells	0.90	100
DeKalb	1,600	Wells	---	---
Denison	17,000	Imp. Res.	2.50	147
Dimmitt	1,500	Wells	0.21	140
Dumas	5,000	Wells	0.70	140
Electra	6,000	Lake-Wells	0.50	83
Friona	1,400	Wells	0.52	371
Gilmer	4,000	Wells	---	---

^{1/} Developed from the basic water supply data contained in "Municipal Sanitary Status in Texas" (1950) compiled by Texas State Department of Health.

* 1950 data.

** Heavy industrial use.

Community	Estimated Pop. Served	Source of Supply	Water Use	
			Avg. Plant Output (MGD)	Per Capita (G.P.D.)
TEXAS SECTION (Cont'd)				
Henrietta	3,500	Little Wichita R.	0.18	51
Hereford	7,500	Wells	2.50	334
Honey Grove	2,100	Wells	0.19	90
Hughes Springs	1,400	Wells	0.09	64
Iowa Park	2,000	Well	0.28	140
Jefferson	2,500	Wells	0.20	80
Ladonia	1,000	Wells	0.07	70
Lefors	1,000	Wells	0.10	100
Linden	1,600	Wells	0.09	56
Lockney	2,000	Wells	0.26	130
Marshall	22,000	Lake	1.80	82
Matador	2,000	Wells	0.27	135
McLean	2,000	Wells	0.19	95
Memphis	4,000	Wells	0.50	125
Mount Pleasant	6,200	Imp. Res.	0.75	121
Mount Vernon	1,400	Wells	0.12	86
New Boston	3,000	Imp. Res.	0.19	63
Nocona	4,000	Wells	0.23	57
Paducah	3,000	Wells	0.30	100
Pampa	17,000	Wells	2.00	118
Panhandle	1,350	Wells	0.21	155
Paris	21,000	Res. Imp.	2.20	105
Perryton	4,400	Wells	1.20	273
Pittsburg	3,200	Wells	0.25	78
Quanah	5,000	Wells	0.035	7
Saint Jo	1,500	Wells	0.12	80
Shamrock	4,700	Spring & Well	0.30	64
Sherman	20,000	Wells	1.80	90
Spearman	1,800	Wells	0.22	122
Stratford	1,800	Wells	0.20	111
Sulphur Springs	9,000	Imp. Res.	0.75	83
Sunray	1,525	Wells	0.29	190
Terrell	10,000	Imp. Res.	0.70	70
Texarkana #1	4,000	Wells	3.20	800
#2		Imp. Res.		

Community	Estimated Pop. Served	Source of Supply	Water Use	
			Avg. Plant Output (MGD)	Per Capita (G.P.D.)

TEXAS SECTION (Cont'd)

Tulia	3,000	Wells	0.48	100
Turkey	1,000	Wells	0.10	100
Vernon	15,000	Wells	1.00	67
Wake Village	1,800	Wells	0.11	61
Wellington	4,000	Wells	0.25	62
Wheeler	1,200	Wells	0.10	83
Whitesboro	1,600	Wells	0.10	63
Whitewright	1,300	Wells	0.07	54
Wichita Falls	75,000	Lake Kickapoo	8.00	107
Wolf City	1,350	Reservoir	0.10	74

APPENDIX B

Information on Present Deficiencies (Quantity & Quality) for Municipal Water Supplies

The information on deficiencies was obtained from various State agencies interested in municipal water supply problems. Municipalities are listed by State sections of drainage basins.

APPENDIX B

MUNICIPAL WATER SUPPLY DEFICIENCIES IN ARKANSAS

Municipality	Population 1950	Source of Supply	Deficiencies	Remarks
Greenwood Mansfield Prairie Grove	1,634 869 939	<u>ARKANSAS RIVER BASIN</u> Impoundment Impoundment Spring	Quantity Quantity Quantity	
Huntsville Mountainview	1,010 1,043	<u>WHITE RIVER BASIN</u> Spring Wells	Quantity Quantity	
Mineral Springs	751	<u>RED RIVER BASIN</u> Well	High Fluorides	Fluorides increasing

APPENDIX B

MUNICIPAL WATER SUPPLY DEFICIENCIES IN COLORADO (ARKANSAS BASIN)

Municipality	1950 Population	Population Served	Source of Supply	Deficiencies	Possible Solution	Present Status
Pueblo	63,561	66,000	Arkansas River	Southside plant short of water in summer. Their water rights do not allow for storage to carry them over.	Obtain better water rights	---
La Junta	7,712	7,712	Wells	Hardness	Softening	---
Las Animas	3,229	2,422	Wells	Hardness	Softening	---
Lamar	7,715	5,500	Wells & Infil. Gallery	Insufficient supply	Obtain more ade- quate supply	In process of drill- ing new wells.
Granada	547	547	Wells	Insufficient supply	More storage	Active planning
Wiley	413	413	Arkansas River	Insufficient storage	More storage	---
Sugar City	521	521	Wells	Insufficient supply	More wells	---
Ordway	1,291	1,291	Springs	Insufficient storage	More storage	Active planning
Crowley	380	380	Well	Insufficient supply	Obtain more adequate supply	---

APPENDIX B

MUNICIPAL WATER SUPPLY DEFICIENCIES IN KANSAS (ARKANSAS BASIN)

Municipality	1950 Population	Present Population Served	Source of Supply	Deficiencies	Remarks
Altamont	652	---	None		City advised that an adequate supply of ground water probably not available.
Dexter	354		Wells	Highly mineralized	
Reading	289		Wells	Limited quantity and quality relatively poor.	Consulting engineers recommended expansion of present well system for immediate needs. Future needs to be supplied by supplementing well supply from Kanopolis Reservoir or from North Fork of Minnescah River.
Wichita	168,279	205,000	Wells	Inadequate quantity	

APPENDIX B

MUNICIPAL WATER SUPPLY DEFICIENCIES IN LOUISIANA

According to State Department of Health records there are no major towns, within the AVR portion of Louisiana, affected by quantity problems. However, some of the cities have supplies with certain chemical characteristics which are above Public Health Service Drinking Water Standards but can be removed by treatment.

APPENDIX B

MUNICIPAL WATER SUPPLY DEFICIENCIES IN MISSOURI
(ARKANSAS & WHITE BASINS)

There are no critical ground water conditions at the present time, according to the Division of Health of Missouri.

APPENDIX B

MUNICIPAL WATER SUPPLY DEFICIENCIES IN NEW MEXICO (ARKANSAS BASIN)

Municipality	Present Population Served	Per Capita Use Daily	Source	Deficiencies		Possible Solution	Remarks
				Quantity	Quality		
Cimarron	855	30 - 40	Surface	None	--	--	Low consumptive use
Des Moines	282	30 - 40	Wells	None	--	--	Low consumptive use
Farley	125	40 - 50	Wells	None	--	--	Low consumptive use
Folsom	--	---	---	?	--	Add'l studies	Information lacking
Forrest	--	---	Wells	?	--	Add'l studies	Information lacking
Grenville	102	10 - 30	Wells	?	--	Add'l studies	Information lacking
Grady	130	---	Wells	None	--	--	--
*Las Tusas	67	10 - 30	Well	None	--	--	State sponsored domestic project
Maxwell	404	30 - 40	Wells ?	None	--	--	Low consumptive use
*Mora-Cordillera	1000	---	Well	None	--	--	State sponsored domestic project
Mosquero	583	20 - 30	Wells	Short?	--	Add'l studies	--
*Ojo Feliz	300	---	Well	None	--	Add'l studies	State sponsored domestic project
Roy	1074	20 - 30	Wells	--	--	Add'l studies	Low consumptive use
San Jon	362	?	Wells	--	--	Add'l studies	--
Springer	1566	150 - 160	Surface	Short	--	Add'l studies	Consulting Engineer employed for plant expansion & supplemental supply
Tucumcari	10776	100 - 110	Wells	Short	--	Add'l studies	U.S.G.S. engaged in studies

Note: The above places are those reported in the 1950 census plus those for which information was readily available.

* These are places in which the State Department of Public Health has assisted in replacing unsafe ditch water supplies with sanitary drilled well supplies for domestic use.

APPENDIX B
MUNICIPAL WATER SUPPLY DEFICIENCIES IN OKLAHOMA
(Arkansas River Basin)

Town	County	Population 1950	Present Source of Municipal Supply	Status of Present Source of Municipal Supply		Possible Source for Future Development	Status of Present Planning
				Quantity	Quality		
Avant	Osage	389	Wells	Adequate	Inadequate		None
Allen	Pontotoc	1,216	Wells	Adequate	Inadequate		None
Arapaho	Custer	311	Well	Adequate	Inadequate		None
Barnsdall	Osage	1,708	Bird Creek	Adequate	Inadequate	Impounded reservoir	Active planning
Bixby	Tulsa	1,517	Well (dug)	Adequate	Inadequate	Springs-of doubtful quantity, Tulsa	Tulsa source under engineering study
Braman	Kay	392	Wells	Inadequate	Inadequate	Blackwell municipal supply	None
Broken Arrow	Tulsa	3,260	Spring & Well	Inadequate	Adequate	New well field	Active planning
Chandler	Lincoln	2,724	Wells	Inadequate	Adequate	Impoundment on Bellcow Creek	Discussion only
Cherokee	Alfalfa	2,635	Wells	Adequate	Inadequate	New well field & softening	Plans approved
Clayton*	Pushmataha	612	None			Surface supply-lake 3 miles from town	None
Coweta	Wagoner	1,601	Spring & creek	Inadequate	Adequate	Impoundment on Cedar Creek	
Davenport	Lincoln	841	Wells	Inadequate		Surface supply or new well field	Active Planning
Fairboro	Pottawatomie	278	Wells	Inadequate	Inadequate	New well field	None

MUNICIPAL WATER SUPPLY DEFICIENCIES IN OKLAHOMA (Continued)
(Arkansas River Basin)

Town	County	Population 1950	Present Source of Municipal Supply	Status of Present Source of Municipal Supply		Possible Source for Future Development	Status of Present Planning
				Quantity	Quality		
Enid	Garfield	36,017	Wells (46)	Inadequate	Adequate	1) Terrace deposits along Cimarron River between Cleo Springs and Dover 2) Canton reservoir	Active planning
Francis	Pontotoc	271	Wells (dug)	Inadequate	Adequate	New well field (in or near city limits)	Plans approved, not constructed
Lamont	Grant	594	Wells	Adequate	Inadequate		None (Satisfied)
Marland	Noble	221	Well	Inadequate			
Maud	Seminole	1,389	Wells	Adequate	Inadequate		None
Newkirk	Kay	2,201	Reservoir wells	Inadequate	Adequate	Wells (hard)	
N.E. State Hosp. (Vinita)	Craig		Wells	Adequate	Inadequate	Vinita municipal supply	
Ochelata*	Washington	357	No municipal system-cisterns	Inadequate		Surface supply	Plans approved 1940-not const- ructed
Purcell	McClain	3,546	Wells	Inadequate	Adequate	Reservoir treatment plant; new well fields	Discussion only
Quinton	Pittsburg	951	Reservoir	Inadequate	Adequate	Increase capacity of reservoir	Discussion only

MUNICIPAL WATER SUPPLY DEFICIENCIES IN OKLAHOMA (Continued)
(Arkansas River Basin)

Town	County	Population 1950	Present Source of Municipal Supply	Status of Present Source of Municipal Supply		Possible Source for Future Development	Status of Present Planning
Ramona	Washington	583	Wells	Inadequate	Adequate	Lake development (\$60,000; 17.0 acres)	Active planning
Stigler	Haskell	2,125	Reservoir	Inadequate	Adequate	Additional reservoir	Discussion only
Strong City	Roger Mills	107	Well (not used for drinking)	Adequate	Inadequate		None
Stroud	Lincoln	2,450	Wells	Inadequate	Inadequate	Surface supply or new well field	Active planning
Taloga	Dewey	430	Well	Adequate	Inadequate		None
Vanette	Pottawatomie	594	Wells (dug)	Inadequate	Inadequate	Surface supply or new well field	Active planning

*Does not have a municipal supply at present time.
Municipal supply possible with cooperative community effort.

MUNICIPAL WATER SUPPLY DEFICIENCIES IN OKLAHOMA
(Red River Basin)

Town	County	Population 1950	Present Source of Municipal Supply	Status of Present Source of Municipal Supply		Possible Source for Future Development	Status of Present Planning
				Quantity	Quality		
Ada	Pontotoc	16,500	Byrd's Mill Spring	Inadequate	Adequate	Surface reservoir	Plans approved
Anadarko	Caddo	6,184	Washita River	Inadequate	Inadequate	Ft. Cobb Reservoir	Active planning
Boswell	Choctaw	875	Well	Inadequate	Adequate	Surface reservoir (Boswell Reservoir)	None
Broken Bow	McCurtafn	1,838	Lake	Inadequate	Adequate	Increase reservoir capacity or Broken Bow Reservoir	Discussion only
Cache	Comanche	677	Wells	Inadequate	?		None
Chickasha	Grady	15,842	Washita River	Inadequate	Inadequate	Ft. Cobb Reservoir	Active planning
Clinton	Custer	7,555	Lake	Inadequate			
Cordell	Washita	2,920	Impoundment	Inadequate			
Elk City	Beckham	7,962	Wells	Inadequate			
Hobart	Kiowa	5,380	Impoundment	Inadequate			
Indianahoma	Comanche	319	Well	Adequate	Inadequate		None (satisfied)
Leedey	Dewey	558	Wells	Adequate	Inadequate		None
Roosevelt	Kiowa	679	Wells	Inadequate	Inadequate		Discussion only

MUNICIPAL WATER SUPPLY DEFICIENCIES IN OKLAHOMA (Continued)
(Red River Basin)

Town	County	Population 1950	Present Source of Municipal Supply	Status of Present Source of Municipal Supply		Possible Source for Future Development	Status of Present Planning
				Quantity	Quality		
Texola	Beckham	265	Well (Not used for drinking)	Adequate	Inadequate		None
Wapanucka	Johnston	592	Spring & lake	Inadequate	Adequate	Surface supply	None

APPENDIX B

MUNICIPAL WATER SUPPLY DEFICIENCIES IN TEXAS

Municipality	Population 1950	Source of Supply	Deficiencies	Remarks
			<u>UPPER RED RIVER BASIN</u>	
Burkburnett	4,555	Wells	Quantity	
Canyon	4,364	Wells	Fluorides (2.4 p.p.m.)	
Hereford	5,207	Wells	Fluorides (2.9 p.p.m.)	
Memphis	3,810	Wells	High sulphates, total solids	
Paducah	2,952	Wells	High sulphates, chlorides, total solids	
Shamrock	3,322	Spring & Well	High nitrates	
Tulia	3,222	Wells	Fluorides (3.6 p.p.m.)	
Vernon	12,651	Wells	High iron in some wells	
Wellington	3,676	Wells	High sulphates, iron, total solids	
			<u>ARKANSAS RIVER BASIN</u>	
Amarillo	74,246	Wells	Fluorides (3.7 p.p.m.)	
Dumas	6,127	Wells	High iron	
Pampa	16,583	Wells	High iron	
Perryton	4,417	Wells	High iron, fluorides (2.5 p.p.m.)	
			<u>LOWER RED RIVER BASIN</u>	
Clarksville	4,353	Wells	High sodium salts	
				Out of water summer of '51 (maximum daily use of .667 m.g.d.)